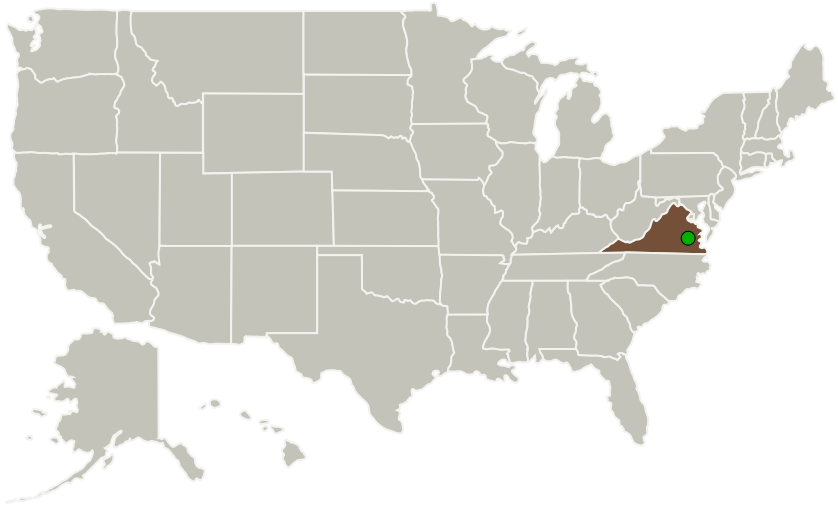
Polyimide Nanocomposite Circuit Board Materials to Mitigate Internal Electrostatic Discharge, Phase I

Completed Technology Project (2011 - 2012)

Project Introduction

In Sub-topic T8.02, NASA has identified a need for improved circuit boards to mitigate the hazards of internal electrostatic discharge (IESD) on missions where high energy electrons may lead to internal electrostatic discharge-based failure. The proposed STTR program will transition polymer technology developed at the Research Institution, the College of William and Mary, to NASA programs and to the private sector through the aegis of the Small Business, International Scientific Technologies, Inc. The program Technical Objectives include evaluation and selection of nanoparticle, organometallic, and metal-ligand additives compatible with polyimide resins to produce electrically conductive circuit boards that reduce the effects of IESD, fabrication of polyimide films incorporating metallic nanostructures to optimize both volume and surface electrical resistivities, and characterization of electrical conductivity, electron beam charging effects, and thermo-mechanical properties of the polyimide resin circuit board materials. The innovation of the Phase I and Phase II programs is the development of polyimide nanocomposite circuit board materials that are resistant to Internal Electrostatic Discharge. The Technology Readiness Level (TRL) is 2 at the beginning of Phase I and 4 or higher at the end of Phase I.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
International Scientific Technologies, Inc.	Lead Organization	Industry	Dublin, Virginia
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia
William & Mary	Supporting Organization	Academia	Williamsburg, Virginia

Primary U.S. Work Locations
Virginia

Project Transitions

February 2011: Project Start

February 2012: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138414)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

International Scientific Technologies, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Russell J Churchill

Co-Investigator:

Russell Churchill

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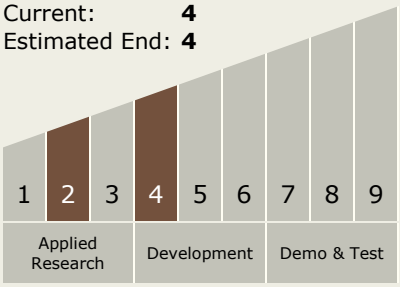
Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.1 Materials
    - TX12.1.1 Lightweight Structural Materials

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System